

IN THE DRAWING

The Examiner objected to Figures 18-21, indicating that they should be labeled as "Prior Art". The Applicant submits herewith a Transmittal of Replacement Sheets of Corrected Drawing, and four corrected replacement sheets (Figs. 18-21), adding the labels.

REMARKS

The Applicant requests reconsideration of the rejection.

Claims 1-15 are now pending.

The Applicant submits herewith a Transmittal of Replacement Sheets of Corrected Drawing to address the Examiner's objection on Page 2, Item 2 of the Office Action.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Geva et al., U.S. 6,707,676, (Geva) in view of Pellant et al., U.S. 4,188,996, (Pellant). Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Geva in view of Pellant as applied to Claims 1-4 above and further in view of Thomas, U.S. 6,167,948, (Thomas). Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Geva in view of Pellant as applied to Claims 1-4 above and further in view of Uead et al., U.S. Patent Publication Serial No. 2001/0018967, (Uead). Finally, Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Geva in view of Pellant et al and Thomas as applied to Claims 5 and 6 above and further in view of Uead. The Applicant traverses these rejections as follows.

The liquid cooling jacket according to the invention incorporates a plurality of radiating fins formed as a multilayer, such that coolant flows between the radiating fins

to cool a heating element such as a processor. The radiating fins are arranged around a post which transfers heat in a direction perpendicular to the heating element, so as to make the coolant flow around the post. The invention claimed in claims 1-12 particularly features a partition that fills intervals between the plurality of radiating fins, so as to separate the inlet and the outlet for the coolant. With this structure, the cooling jacket provides high radiating efficiency.

The primary reference to Geva discloses a heat sink comprising a base bonded to a heating element, a post rising perpendicularly to the base, and a plurality of radiating fins mounted on the post parallel to the base. Geva, however, discloses an air funnel arranged adjacent to the post to supply cooling air flowing in only one direction in the heat sink.

The secondary reference to Pellant discloses an apparatus for cooling a semiconductor element, including a housing having a partition and using a liquid as a coolant.

In combination, Geva and Pellant appear to be relevant to the claimed invention. However, the "partition" in the claimed invention is different in both structure and function

from the partition disclosed in Pellant, such that the invention is not obvious from the combination.

In Pellant, the coolant passage (including slots 5 and bores 7) is formed between studs, to thereby dissipate the heat generated in the semiconductor and transferred to the studs. Pellant's partition is provided nearly along the entire diametrical extent of the housing to define the coolant passage between the studs, separating the inlet side from the outlet side.

On the contrary, the "partition" in the claimed invention is a radial partition provided between the post and the case radially, to separate the coolant inlet and outlet. The passage for coolant according to the invention is thus defined by the post, the case, the base, and the radiating fins so that the partition in the invention forms the end portion of the passage.

Therefore, the "partition" of the invention would not be obvious from the combination of Geva and Pellant, which would require the nearly diametrical partition of Pellant in accordance with the express teachings of any such combination.

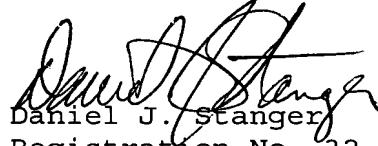
Claims 2-4, 5-6, and 7-12, are dependent on Claim 1, and thus inherit the patentability of the independent claim. The Applicant notes, however, that each of these dependent claims

sets forth separately patentable structures of the post, radiating fins, and heat sink considered in the various combinations as claimed therein.

New claims 13-15 are directed to a liquid cooling jacket that is not limited by requiring the plurality of radiating fins set forth in claim 1. Independent claim 13 features a spiral passage defined by the radiating fin, which is neither disclosed nor suggested by the art of record. Further, dependent claims 14 and 15 respectively recite post and radiating fin features that have separate patentability in combination with the limitations of claim 13.

In view of the foregoing amendments and remarks, the Applicant respectfully requests reconsideration of the rejection and allowance of the claims.

Respectfully submitted,

  
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